

Northwest Africa 3136

Anorthosite-bearing basaltic regolith breccia

95.1 g



Figure 1: Northwest Africa (NWA) 3136; approximately 5 cm wide (photo by G. Hupe).

Introduction

Northwest Africa (NWA) 3136 was found in Algeria or Morocco and purchased in April 2004 (Fig. 1). It is partially covered with a thin pale brown fusion crust, and a thin dark weathering varnish (Russell et al., 2005). The interior is dark and vitreous with white or yellowish clasts up to 0.5 cm in size (Fig. 2).



Figure 2: Slab cut of NWA 3136 illustrating the feldspathic nature of the sample (photo from R. Korotev).

Petrography, mineralogy, and chemistry

Lithic clasts in this breccia are comprised of mare basalt, mare micro-gabbro, and some norite and anorthosite clasts of highlands affinity (Russell et al., 2005; Kuehner et al., 2005). Mineral clasts include plagioclase feldspar, pyroxenes, olivine, ilmenite, FeNi metal, troilite, and Cr-bearing ulvöspinel. There are rare occurrences of pentlandite, baddeleyite, and zirconalite. Pyroxenes from many of the clasts follow the general trend exhibited by pyroxenes from low Ti or very low Ti basalts (Fig. 3), but there are a few clasts that follow a high Ti pyroxene trend, somewhat rare for lunar basaltic meteorites (Kuehner et al., 2005). Pyroxenes in general are more ferroan in composition (Fig. 3 and 4), with only one or two clasts from the study of Kuehner et al. (2005) showing compositions like highlands lithologies (Fig. 4).

The composition of NWA 3136 is clearly intermediate between basaltic and feldspathic lunar meteorites, with ~ 16 wt% FeO, 12.5 wt% CaO (Fig. 5). Thorium and Sc contents are similar to EET 87521/96006 (Fig. 6), but its Cr contents are significantly higher. Overall its composition is distinct from any other of the "mingled" lunar meteorites such as EET's or MET 01210 (Korotev and Irving, 2005).

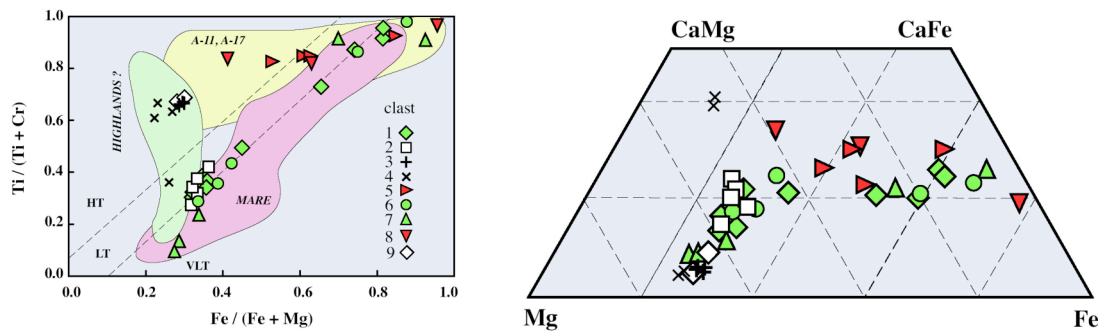


Figure 3: Pyroxenes from clasts 5 and 8 with Apollo 11 and 17 like trends (from Kuehner et al. (2005)).

Figure 4: Pyroxene quadrilateral diagram for NWA 3136 (from Kuehner et al., 2005).

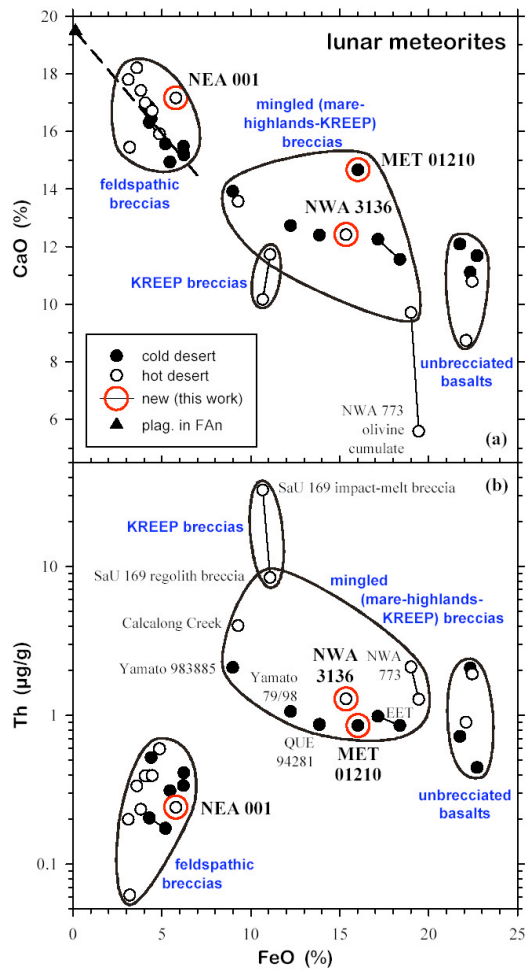


Figure 5: CaO, FeO and Th contents of several lunar meteorites including NWA 3136 (from Korotev and Irving (2005)).

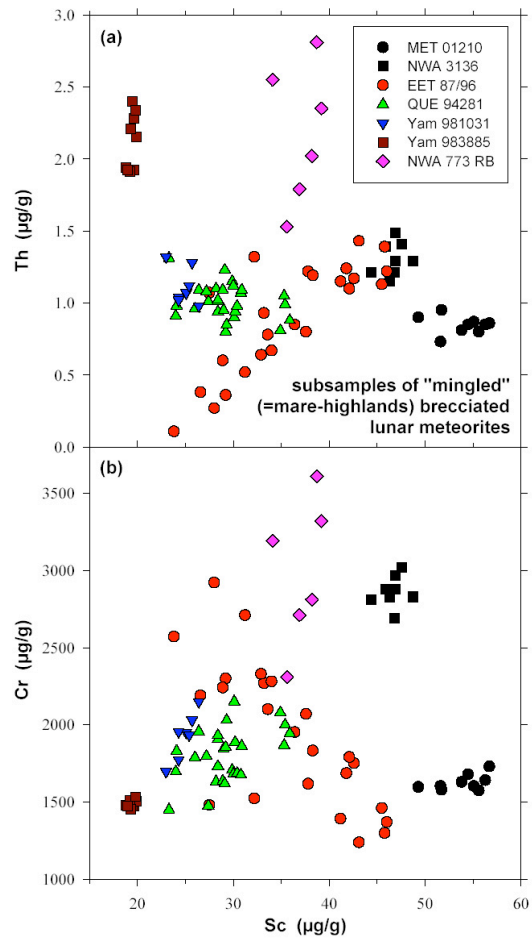


Figure 6: Cr, Sc, and Th contents of several lunar meteorites including NWA 3136 (from Korotev and Irving (2005)).